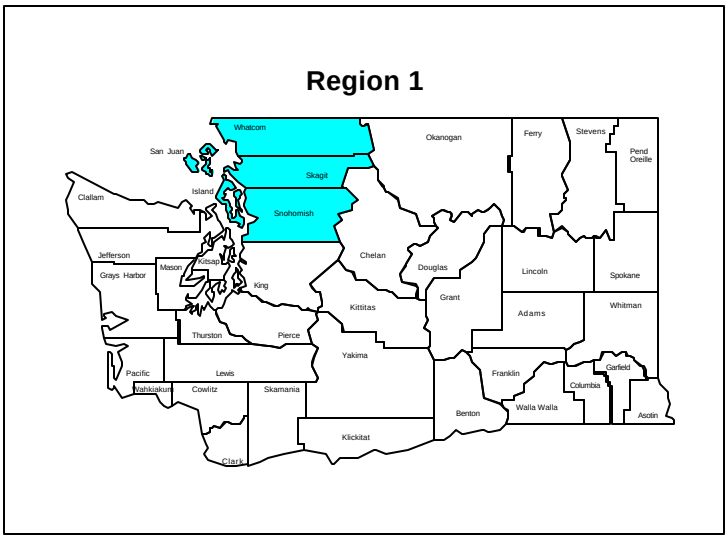
Region 1

Region 1 includes the counties of Island, San Juan, Skagit, Snohomish, and Whatcom, in the northwest corner of the state.

The terrain of the region is about as varied as there is in the state. Two of the region's counties – Island and San Juan – are surrounded by water. Skagit, Snohomish, and Whatcom Counties run from the shores of Puget Sound in the west, to the crest of the Cascade Mountains in the east.



About one out of every six people in Washington live here. This region is one of the fastest growing in the state; it grew faster than the state as a whole during the 1990s. Most of the population lives in Puget lowland in the western portion of the region.

The population is less diverse than the state as a whole. Island and San Juan Counties in recent years have become attractive to retirees and have significant populations over the age of 65. Whatcom County has a lower than average age because a significant percentage of its population is college students.

Because of their location on the middle of Puget Sound, Island and San Juan Counties are heavily dependent on the state ferry system for transportation of people and goods. A significant percentage of the region's residents commute to jobs in other counties. The region has a diverse economy – with a strong military presence (Island and Snohomish Counties); significant agriculture and petroleum refining industries (Skagit and Whatcom Counties); and major manufacturing sector, primarily the production of commercial aircraft (Snohomish County).

The Counties

Island County[1]

Island County has five islands – Whidbey, Camano, Ben Ure, Strawberry, and Smith. The county is one of two – the other being San Juan County – surrounded by water. The county is 212 square miles in size. It ranks 38th in size among the state's 39 counties, only neighboring San Juan County is smaller.

About two-thirds of Island County's 71,558 residents live in unincorporated areas around townships such as Clinton, Freeland, and Greenbank, and along the shores of Camano Island. The remaining residents live in one of three cities – Coupeville,

Langley, or Oak Harbor, the largest city in the county. The county's population grew by nearly 19 percent between 1990 and 2000, just less than the state as a whole.

Since 1970, however, Island County has grown much faster than the state as a whole. The greatest period of growth was the 1970s with the movement of military personnel at the Whidbey Island Naval Air Station. Island County is the fifth most densely populated county in the state, with 347 residents per square mile.

The islands were formed millions of years ago by a combination of volcanic and glacial activity; what emerged were relatively distinct lowlands and highlands. Lowlands start at sea level and rise to about 200 feet, comprised mostly of steep and rocky cliffs, and pebbled beaches. The highlands range from 200 to 580 feet above sea level, with forested hills and grassy valleys and plains, and dotted with numerous small lakes and ponds.

East of Island County is the Washington mainland (Skagit and Snohomish counties), from which it is separated by Skagit Bay, Saratoga Passage, Port Susan, and Possession Sound. West are the Rosario Strait, the Strait of Juan de Fuca, and Admiralty Inlet, which separate Island County from the San Juan Islands (San Juan County) and the Olympic Peninsula (Clallam and Jefferson Counties). Deception Pass separates the northern end of Island County from Fidalgo Island (Skagit County) and the mainland.

Economically, Island County has changed from the trading and fishing activities of the original Native American inhabitants to an economy dominated by a huge military presence and defense spending. In between were Hudson's Bay Company fur trappers, as well as loggers, fishers and farmers (who still occupy a niche). Further, the beauty of the islands draws tourists and retirees.

The military has had a presence on Whidbey Island since the late 1890s. Fort Casey and Fort Ebey were built to defend the entrance to Admiralty Inlet and Puget Sound; they were deactivated after the Korean Conflict and are now used as recreation areas. Whidbey Island Naval Air Station, established in 1942, is now home to all of the Navy's electronic warfare squadrons that fly the EA-6B Prowler, a carrier-based tactical aircraft, as well as other patrol and reconnaissance squadrons that fly aircraft that include the P-3C Orion.

San Juan County[2]

San Juan County, at 179 square miles, is the smallest of Washington's counties. It is one of two counties surrounded by water.

San Juan County is a cluster of about 200 islands, 172 named, and only 12 of which are populated. The topography of the larger islands is one of steep and rugged terrain. It once supported dense stands of Douglas fir, with the valleys covered with cedar. Heavy logging cleared much of the old-growth timber. The topography of the tidelands, about

370 miles, varies widely from open expanse of sandy beach to treacherous vertical cliffs to small pocket beaches.

The county is set amid the windy straits of northwest Washington. To its east and northeast is the Washington mainland, principally Whatcom and Skagit counties, from which the Rosario Strait separates it. To the west and northwest lie Vancouver Island and the Canadian mainland, from which the county is separated by Haro Strait and the Strait of Georgia. South of the county is Island County and the Olympic Peninsula (principally Jefferson and Clallam counties). The Rosario Strait separates San Juan County from Island County, and Strait of Juan de Fuca separates it from the Olympic Peninsula.

Of San Juan County's 14,077 residents in 2000, about 14 percent live in Friday Harbor, the county's only city, on San Juan Island. Remaining residents are concentrated in unincorporated parts of San Juan Island, as well as on Orcas, Lopez, and Shaw Islands. Since 1970, the county has been the fastest growing in the state, 229 percent compared to the state's 69 percent. In the 1990s, the county's population grew by more than 40 percent, nearly double that of the state. It has a population density of 82 residents per square mile, making San Juan the 11th most densely populated county in the state.

San Juan County is an economic anomaly. The land mass is small and surrounded by water, with ferry being the primary mode of travel to and from the islands, and the population is quite small by Puget Sound standards. The driving force behind its growth is its natural beauty. The islands are scenic, and attract great numbers of people. Tourists come in droves, and many people choose to retire there.

Skagit County[3]

Skagit County, with an area of 1,735 square miles, is 21st in size among Washington's 39 counties.

Skagit County's population in 2000 was 102,979; about six in ten people live in cities. The county has been growing faster than the state. Since 1970, the population doubled. From 1990 to 2000, the population grew 29.5 percent, compared to the state's 21.1 percent growth. With 60 residents per square mile, Skagit County is the 13th most densely populated county in the state.

Skagit County has eight cities. The largest is Mount Vernon, with just under half the county's incorporated population. Other major cities are Anacortes, Sedro Woolley, and Burlington. The county is home to two Indian Reservations – the Swinomish Indian Reservation, home to Swinomish and Skagit Indians, and the Upper Skagit Indian Reservation, east of Sedro Woolley.

The county's terrain is one of marked contrasts. The western third includes a broad delta and floodplain, both of which extend inland through the rich and fertile Skagit

Valley, or Skagit Flats. At its western extreme, the county includes some of the islands perched on the leeward edge of the San Juan Archipelago, including Fidalgo Island. Rugged, heavily wooded Cascade Mountains dominate the eastern two-thirds of the county. Most of the Cascades are part of either Mount Baker-Snoqualmie National Forest or North Cascades National Park.

The Skagit River is the dominant river. From its origin in the northeastern part of the county and running through the valley, the Skagit flows down from the Cascades. Along the county's north central border, it passes Lake Shannon, created by the Lower Baker Dam. From there, it flows west towards the San Juan Islands before emptying into the Puget Sound.

Skagit County's economy is growing steadily, and historically regarded as one of the fastest growing areas in the state. Agriculture, fishing, wood products, tourism, international trade, and specialized manufacturing make up the economy of the county. With its accessible ports and refineries, Skagit County is the center of the state's petroleum industry.

Snohomish County[4]

Snohomish County population was 606,024 in 2000; it is the third largest of Washington's counties, behind King and Pierce.

Its population in the 1990s increased by more than 140,000; about 62 percent of the increase is due to people moving to the county. In 1999, nearly one out of every four migrants into the state settled in Snohomish County, ranking the county second, after Clark County, in the percentage of new migrants settling in Washington State.

With an area of 2,090 square miles, it is the 13th largest county in the state. It has 296 residents per square mile, making it the sixth most densely populated county. The vast majority of those residents reside in the western third of the county. Everett, the largest city, lies on Port Gardner Bay. Other major cities are Edmonds, Lynnwood, Marysville, Mountlake Terrace, Mukilteo, and Bothell. The county also is home to the Tulalip Indian Tribe.

The Snohomish River is the principal river in the county. It begins just southwest of Monroe, created by the combining of the Snoqualmie River, flowing down from Snoqualmie Pass, and the Skykomish River, flowing down from Stevens Pass. The Snohomish continues northward and empties into Puget Sound on the north side of Everett. This river system and its tributaries (the Sultan and Pilchuck Rivers) have created fertile valleys that support various agricultural activities and dairy farming. Numerous sloughs carve through the floodplain immediately east of Everett, creating low-lying islands and estuaries. In the northwest county, the Stillaguamish River has created a large and fertile valley. The Sauk River flows through the northern part of the county and is a major tributary of the Skagit River in Skagit County.

Eastern Snohomish County features the rugged terrain of the Cascade Mountains. This part of the county includes the Henry M. Jackson Wilderness, Glacier Peak Wilderness, and Boulder River Wilderness areas. Glacier Peak, 10,541 feet, is the tallest point in the county. Other significant mountains include Sloan Peak, 7,835 feet; Kyes Peak, 7,280 feet; and Monte Cristo Peak, 7,233 feet.

The Snohomish County economy is an urban-rural mix. Agriculture, logging, and small-town activity predominate in the northern and eastern regions of the county, while a high technology, urban job market predominates in Everett and the southern part of the county. The Boeing Company and its airplane manufacturing is a major force in the economy, but more than Boeing has fueled growth. Other forms of manufacturing, especially in advanced technology, have started up or relocated to the county. Much of this development activity is concentrated in the county's Technology Corridor, a 10-mile stretch along the Interstate 5 / Interstate 405 area. Adding to the county's recent economic growth is Naval Station Everett. The arrival of the USS Abraham Lincoln Carrier Group brought more than 16,000 new residents and more than 11,000 new jobs.

Whatcom County[5]

Whatcom County is 2,120 square miles, 12th in size among Washington counties. Its population in 2000 was 166,814 residents, and its nearly 200 percent growth since 1970 out-stripped that of the state. Population density is 80 residents per square mile, ranking 12th in the state.

More than half of the county's residents live in cities; Bellingham is the largest city, with three-quarters of the incorporated population. Other major cities include Ferndale and Lynden, which grew nearly 62 percent in the 1990s. The Lummi Indian Tribe also calls the county home.

Once covered with virgin timber, the western third of the county has lush rolling hills interspersed with level terrain. The terrain becomes increasingly elevated as it extends east toward the Cascade Mountains. The eastern two-thirds of the county have rugged mountains and dense forests; this area of the county is part of either the Mount Baker-Snoqualmie National Forest or the North Cascades National Park. The highest elevations in the county are Mount Baker, at 10,778 feet; Mount Redoubt, 8,956 feet; and Jack Mountain, 8,928 feet.

The Nooksack River is the principal river in Whatcom County. Starting high in the Cascades, the Nooksack flows west through the county before emptying into Bellingham Bay. Most notable of the county's numerous lakes are Ross Lake, Baker Lake, and Lake Whatcom.

The economy of Whatcom County historically was based on agriculture, fishing, and timber. Although all three have declined greatly, both farming and timber remain relatively strong industries and fishing still has a presence. In recent years, there has been rapid growth in trade and services employment, making them both very important

sectors of the local economy. The manufacturing sector, which includes the timber industry, is healthy and diversified with strength coming from a number of different industries.

The county has a slightly younger population than the state average, especially in the 20 to 24 age group, due to the presence of Western Washington University, Whatcom Community College, and Bellingham Technical College.

Population and Demographics

Region 1's population grew much faster than the population of the state during the 1990s. As shown on Table 1 below, the region grew by more than 29 percent, 8 percentage points greater than the state as a whole. The region's high rate of growth is expected to continue, and to out-pace that of the state through the year 2025.

Table 1. Population Growth

	1990 Population	2000 Population	% Change	2025 (Projected)	% Change from 2000
Island	60,195	71,558	18.9%	101,079	41.3%
San Juan	10,035	14,077	40.2%	22,534	60.0%
Skagit	79,545	102,979	29.5%	164,797	60.0%
Snohomish	465,628	606,024	30.2%	929,314	53.3%
Whatcom	127,780	166,814	30.5%	246,636	47.8%
Total	**743,183**	**961,452**	**29.4%**	**1,464,360**	**52.3%**
Washington State	*4,866,663*	*5,894,121*	*21.1%*	*7,975,471*	*35.3%*

Source: U.S. Census Bureau, Census 2000; *2002 Population Trends*, State of Washington Office of Financial Management, Forecasting Division; *Washington State County Population Projections For Growth Management*, Intermediate Projection, State of Washington Office of Financial Management, Forecasting Division, January 2002.

Table 2, below, shows the urban and rural character Region 1. As a whole, two-thirds of the region's population lives in densely settled urbanized areas. The most heavily urbanized counties are Snohomish, Whatcom and Skagit. San Juan County's population is rural, while Island County's population is split between urban and rural areas. The current growth pattern, both urban and rural, affects how agencies prepare for emergencies as changes in the population and development can increase risks associated with hazards.

Table 2. Urban/Rural Populations, 2000

	Urban	Rural
Island	37,244	34,314
San Juan	0	14,077
Skagit	69,148	33,831
Snohomish	539,290	66,734
Whatcom	112,920	53,894
Total	**758,602**	**202,850**
Percentage	67.7%	32.3%
Washington State	*81.9%*	*18.1%*

Source: U.S. Census Bureau, Census 2000: Population and Housing by Urban Classification

The ability to prepare for and recover from a disaster varies among population groups. Research on various population groups and disasters found that it took some populations longer to recover from a disaster for a variety of reasons. These population groups include minorities, people with language barriers, the disabled, senior citizens, and those with low income.

Ethnic Groups

People from non-white population groups generally experience longer recoveries due to lower incomes, savings and insurance; their difficulty accessing insurance; and their using aid and relief organizations differently than was anticipated. Language and cultural differences can pose difficulties in some populations' understanding and implementing preparedness and mitigation actions as well as accessing and using available disaster relief.

Table 3, below, shows that Region 1, overall, is less diverse than the state as a whole. Skagit County has a significant Hispanic/Latino population that works in its agriculture industry. Skagit, Snohomish and Whatcom counties also have significant Native American populations.

Table 3. Population by Ethnic Group

	Hispanic/ Latino	Asian	African American	Native American	Total
Island	4.0%	4.2%	2.4%	1.0%	11.4%
San Juan	2.4%	0.9%	0.3%	0.8%	4.4%
Skagit	11.2%	1.5%	0.4%	1.9%	15.0%
Snohomish	4.7%	5.8%	1.7%	1.4%	13.6%
Whatcom	5.2%	2.8%	0.7%	2.8%	11.5%
Washington State	*7.5%*	*5.5%*	*3.2%*	*1.6%*	*17.8%*

Source: U.S. Census Bureau, Census 2000.

Even though Region 1 is not as diverse as the state, a sizable faction of its population does not speak English as its primary language at home and speaks English less than very well, as shown in Table 4, below. This means that a significant segment of the population may have a language barrier that prevents them from preparing for a disaster, responding to an event, or applying for assistance after a disaster.

Table 4. Primary Language Spoken at Home

	Language Other Than English	*English Less Than Very Well*	Spanish	*English Less Than Very Well*	Other Indo-European	*English Less Than Very Well*	Asian-Pacific Islander	*English Less Than Very Well*
Island	**8.2%**	**2.5%**	2.4%	0.6%	2.1%	0.4%	3.4%	1.4%
San Juan	**4.9%**	**1.5%**	2.2%	0.7%	2.0%	0.4%	0.5%	0.2%
Skagit	**11.7%**	**6.3%**	8.6%	5.2%	1.8%	0.6%	1.1%	0.5%
Snohomish	**12.2%**	**5.2%**	3.4%	1.4%	3.6%	1.3%	4.7%	2.3%
Whatcom	**9.2%**	**3.9%**	3.6%	1.6%	3.8%	1.4%	1.4%	0.7%
Washington State	***14.0%***	***6.4%***	*5.8%*	*2.8%*	*3.2%*	*1.3%*	*4.4%*	*2.2%*

Source: U.S. Census Bureau, Profile of Selected Social Characteristics: 2000

Disabled People

People with disabilities often are left out of community preparedness activities for a disaster. They have complex challenges because of hearing, sight, mobility, or mental impairments. Additionally, a significant percentage of working-age people with disabilities do not work. These factors make it difficult for the disabled to prepare in advance of a disaster.

Table 5, below, shows that about one in six working-age Region 1 residents age has a disability that does not require them to be institutionalized, but just over half are employed. About 40 percent of retirement-age people have a disability.

Table 5. Non-Institutionalized Disabled Population

	21 to 64 Years		65 Years and Older
	% of Population	% Employed	% of Population
Island	16.5%	56.0%	36.7%
San Juan	16.4%	67.7%	29.8%
Skagit	18.2%	55.9%	41.5%
Snohomish	16.7%	63.3%	42.8%
Whatcom	14.3%	54.5%	40.7%
Washington State	*17.7%*	*57.6%*	*42.3%*

Source: U.S. Census Bureau, Profile of Selected Social Characteristics: 2000.

Senior Citizens

Senior citizens may be overlooked in preparedness and recovery activities; their age could lead them to have trouble after a disaster, perhaps not qualify for loans, or become disabled because of the disaster. Table 6, below, shows about one of every five people living in San Juan County is over 65, which confirms the county as a haven for retirees; Skagit and Island Counties also have retiree-age populations larger than the state as a whole.

Table 6. Population Over Age 65

	% of Total Population
Island	14.3%
San Juan	19.0%
Skagit	14.6%
Snohomish	9.1%
Whatcom	11.6%
Washington State	*11.2%*

Source: U.S. Census Bureau, Census 2000.

Poverty

The amount of money people have influences what type of housing they live in, whether they can engage in mitigation actions, and how long it takes them to recover. Income is

based on a number of factors, including the individual, the economy, availability of jobs, educational opportunity, among others. Expenses can vary by location – rural places are cheaper to live but have fewer jobs, while urban areas can be costly, even for renters.

Table 7, below, shows that Island, San Juan, and Snohomish Counties have a smaller percentage of people living in poverty than the state as a whole; San Juan and Island Counties because of their significant populations of relatively well-off retirees, and Snohomish because of its high-income manufacturing base. Whatcom County has a greater percentage of its population living in poverty. It has a significant percentage working in lower-paying jobs in the trade and service sectors; a larger than average percentage of younger people attending college; and a population receiving a larger percentage of its income in the form of assistance from the government (i.e., public assistance, food stamps, Social Security, and unemployment insurance).

Table 7. Poverty Rates

	% of Total Population	Children Under 18	Over Age 65
Island	7.0%	8.8%	4.4%
San Juan	9.2%	12.4%	3.1%
Skagit	11.2%	13.5%	6.8%
Snohomish	6.9%	7.6%	7.8%
Whatcom	14.2%	14.2%	8.3%
Washington State	*10.6%*	*13.2%*	*7.5%*

Source: U.S. Census Bureau, Profile of Selected Economic Characteristics: 2000.

School Children

While children overall are captured in figures elsewhere in this profile, the number of children attending school is a concern because many of the school buildings they spend considerable time in each day are older and potentially more vulnerable to the effects of disaster. Table 8, below, shows the population of school-age children in Region 1; it does not show the number that are in potentially vulnerable buildings.

Table 8. School Enrollment – Kindergarten through High School

	Total	Kindergarten	Elementary	High School
Island	13,317	996	8,321	4,000
San Juan	2,184	108	1,461	615
Skagit	18,233	1,444	12,694	4,095
Snohomish	122,466	8,751	76,785	36,930
Whatcom	29,602	2,264	18,378	8,960
Total	**185,802**	**13,563**	**117,639**	**54,600**
Washington State	*1,127,448*	*82,637*	*697,192*	*347,619*

Source: U.S. Census Bureau, Profile of Selected Social Characteristics: 2000.

Housing

Washington's Growth Management Act encourages local jurisdictions to direct population growth into urban growth areas, where growth and higher densities are expected and supported by urban services. It also requires communities to incorporate mitigation by protecting critical areas and restricting development in areas such as those that are frequently flooded or subject to geologic hazards. Eliminating or limiting development in hazard-prone areas can reduce vulnerability to hazards and the potential loss of life and injuries and property damage.

Table 9, below, provides a breakdown by county of various housing characteristics.

Table 9. Housing Development

	Single-Family	Multi-Family	Mobile Homes	Other
Island	77.3%	11.5%	10.9%	0.3%
San Juan	82.7%	7.6%	8.4%	1.3%
Skagit	72.0%	15.6%	11.8%	0.6%
Snohomish	65.7%	26.5%	7.3%	0.5%
Whatcom	63.8%	23.3%	11.5%	1.4%
Washington State	*65.4%*	*25.6%*	*8.5%*	*0.5%*

Source: U.S. Census Bureau, Profile of Selected Economic Characteristics: 2000.

The year housing was built is important for mitigation. The older a home is, the greater the risk of damage from natural disasters. Homes built after 1980 are more likely built to current standards for hazards such as floods, high winds, snow loads, and earthquake. Table 10, below, shows the periods during which housing was built throughout the region.

In Region 1, Island, San Juan, and Snohomish Counties, the fastest growing counties in recent years, have the newest housing stock, with about half their housing built since 1980.

Table 10. Housing – Year Built

	Pre-1939 – 1959	1960 – 1979	1980 – 2000
Island	17.0%	35.6%	47.4%
San Juan	14.0%	30.2%	55.8%
Skagit	30.6%	28.0%	41.1%
Snohomish	18.0%	31.8%	50.3%
Whatcom	26.0%	31.1%	42.9%
Washington State	*29.4%*	*32.7%*	*37.9%*

Source: U.S. Census Bureau, Profile of Housing Characteristics 2000

Household Income

Median household income is an indicator of a region's economic stability. It can be used to compare economic areas as a whole, and it generally shows how income is distributed among the population. Median household income indicates that point where half of all households have a higher income, and half have a lower income.

Table 11, below, shows that the median household incomes in Region 1 are close to the state average. Snohomish County, with its significant high-wage manufacturing sector, has the highest median household income. Whatcom County, with its larger, lower paying trade and service sectors, has the smallest household income in the region.

Table 11. Median Household Income

County	Year 1999
Island	$45,513
San Juan	$43,481
Skagit	$42,381
Snohomish	$53,060
Whatcom	$40,005
Washington State	*$44,776*

Source: U.S. Census Bureau, Profile of Selected Economic Characteristics: 2000

Employment and Industry

The economy of Region 1 is diverse, driven by manufacturing, particularly production of commercial aircraft, in Snohomish County; tourism in San Juan County; the military in Island County; and trade and services in Skagit and Whatcom Counties.

Below are brief descriptions of the economy and employment in the region's five counties.

Island County

Government provides the bulk of employment in Island County; the federal government is the largest component, due to the presence of Whidbey Island Naval Air Station. K-12 education is the second largest component of public-sector employment.

Trade accounted for one quarter of employment in 1998, and the services sector accounted for another 23 percent of employment, primarily in health care. Recent growth in these sectors followed population growth.

San Juan County

Tourism drives the economy of San Juan County. From 1991 to 1997, tourism related expenditures grew rapidly, by 67 percent.

Services is the largest economic sector, with 29 percent of non-farm employment in 1998, with lodging the largest industry in the sector, with half the jobs.

Trade is the second largest component of the county economy, with 23 percent of employment in 1998; jobs in this segment grew 673 percent since 1970.

Skagit County

Skagit County has a significant agriculture industry, accounting for 8 percent of employment in 2000; it is a greater share than for any other county in western Washington. Most employees are involved in crop production (vegetables, fruit, and ornamental nursery products), livestock, and dairies.

Trade, with one of every four jobs, and services, with 21 percent of employment, are the two largest sectors of the county's economy.

Skagit County's manufacturing sector has a number of strong industries, including food processing (the largest manufacturing industry, also the lowest paying), timber, petroleum refining, and transportation equipment. The county is the center of the state's petroleum refining industry, with two refineries in Anacortes.

Skagit County has a higher concentration of workers in seasonal industries than does the state, primarily due to its large agricultural industry and a significant construction industry.

Snohomish County

Manufacturing, primarily commercial aircraft production drives the Snohomish County economy.

The manufacturing sector, with nearly 28 percent of total employment, was more than double the state average in 1999. Employment in aircraft production grew by 106 percent between 1981 and 1999, while manufacturing as a whole increased by 82 percent. (Note: the Employment Security Department projects employment in aircraft and parts will fall nearly 14 percent statewide from fall 2001 through the fall of 2003. Employment in this industry in Snohomish County fell by 16 percent from fall of 2001 to fall of 2002. The primary reason is the reduction in aircraft sales by The Boeing Company due to reduced air travel worldwide from the economic slowdown and fallout from the September 11, 2001 terrorist attacks.)

Trade, with 22 percent of jobs, is the second largest economic sector in Snohomish County.

The service sector is the third largest of the economy, with 20 percent of employment. The largest industry in this sector is health care.

Whatcom County

Trade, with 31 percent of employment, and services, with 28 percent of employment, are the two largest segments of the Whatcom County economy. The employment gains by these sectors in the 1990s resulted from increased shopping by Canadians in this border county during periods of favorable U.S. – Canadian currency exchange rates. These sectors, however, provide lower wages overall than other economic sectors.

The county also has strong employment in agriculture, forestry and fishing sector, with about 5 percent of jobs. Most of this sector's employment is in dairy and berry farms; the county is the largest producer of blueberries, raspberries, and strawberries in the state.

There is significant employment in Whatcom County's manufacturing sector – food processing, lumber and wood products, paper and allied products, oil refining, electrical equipment, and transportation equipment. Food processing is the largest employer in the county, but it pays the lowest average wage in the manufacturing sector.

Government has become a significant source of jobs, replacing industries that are more traditional. The combined presence of Bellingham Technical College, Western Washington University, Whatcom Community College, and the U.S. Customs Service contribute to this.

Commuting Patterns[6, 7, 8]

Recent population growth has resulted in a significant increase in workers, automobiles and trucks on the roads. A higher percentage of workers driving alone can cause traffic congestion and accidents. More traffic places a larger load on the region's transportation infrastructure. The impact of an emergency can disrupt automobile traffic, shut down transit systems, and make evacuations more difficult.

A significant percentage of the region's workforce commutes to other counties for employment.

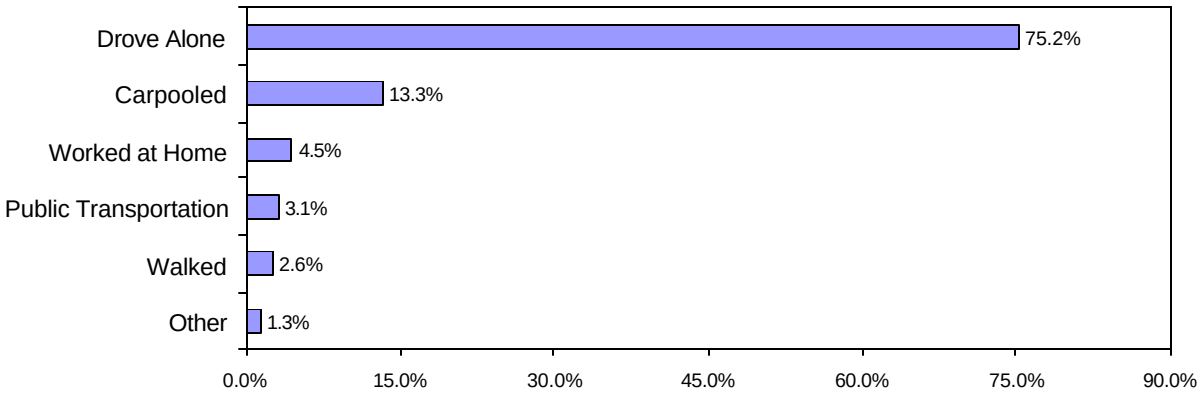
An estimated 100,000 Snohomish County workers commute to King County, and another 7,500 commute to Island, Skagit, and Pierce Counties.

About half of Island County's labor force works outside the county, commuting primarily to Snohomish, Skagit, and King Counties.

And, about 17 percent of Skagit County's employed residents commute to work outside the county, primarily to Snohomish County, Whatcom, King and Island Counties.

Figure 1, below, shows transportation used by commuters. Primary mode of transportation is driving alone. Public transit systems in the five counties carried 13.7 million riders in 2001, with Community Transit, operating primarily commuter routes in Snohomish and King Counties, carrying 8.2 million riders. The state ferry system carried 6.7 million passengers and 2.6 million vehicles between the mainland and Island and San Juan Counties. Vanpools, primarily in the Community Transit service area, carried less than 1 million passengers.

Figure 1. Commuting Patterns



Source: U.S. Census Bureau, Profile of Selected Economic Characteristics: 2000

Hazards and State Facilities Potentially At-Risk

The regional hazard profiles were developed using information from the individual hazard profiles that are part of the Risk Assessment, as well as from reference documents listed at the end of each hazard profile.

Unless otherwise noted below, at-risk facilities were identified by state agencies participating in this plan using methodology identified in the Risk Assessment Introduction, Tab 7.

Figures for the number of staff/visitors/residents for each at risk facility were calculated on the highest use for that facility; for many structures, this inflates the number of individuals in the buildings at any one time.

Western Washington University's building totals include counts for infrastructure including roads, utilities, walkways, telecommunications and other systems.

The Washington Department of Transportation identified essential transportation corridors, or highways and ferry routes of greatest importance to transportation of people and goods and services.

Hazard: Avalanche

Characteristics	Most Vulnerable Areas	Event History	Probability
Avalanches occur when a layer of snow loses its grip on a slope and slides downhill. They occur frequently in the backcountry of the Cascade Range, often without any impact to people, transportation routes or development. Most avalanches that cause injuries or deaths occur outside developed recreation areas; the primary cause of these avalanches is the weight of the victim or someone in the victim's party on the slab of snow. Very few avalanche fatalities occur on open runs in ski areas or on highways. Avalanche season begins in November and runs through early summer for all mountain areas of the state; in high alpine areas of the Cascade Range, the season is year-round.	1. Recreation areas in the Cascade Mountains. 2. State Route 543 to the Mount Baker Ski Area. 3. State Route 20 – North Cascades Highway (closed to traffic in winter).	Among the avalanches in Region 1 since 1910 that resulted in fatalities included those that occurred in 1939 on Mount Baker (six deaths), 1996 near Index (three deaths), 1998 on Mount Baker (one death), 1999 on Mount Baker (two deaths), 2001 on Mount Baker (1 death) and at Lake Ann (1 death), and 2003 on Mount Baker (1 death).	On average, avalanches kill one to two people every year in Washington State. At least 15 avalanche deaths have occurred in Region 1 since 1910.

Hazard: Avalanche **At Risk Population**: Unknown of region total 961,452 **PRELIMINARY ASSESSMENT**

State Agency Structures At Risk Number and Function of Buildings	No. of Affected Staff / Visitors / Residents	Approx. Value of Owned Structures	Approx. Value of Contents All Structures
Total at-risk buildings: Two state highways, no buildings.	0	0	0

Function of at-risk buildings: Two state highways are potentially at risk to avalanche:

1. State Route 542 to the Mount Baker Ski Area.
2. State Route 20 – North Cascades Highway. The highway is closed every winter but it experiences residual avalanche problems in the spring after it is reopened.

Total at-risk critical facilities: One state highway, no buildings.	0	0	0

Function of at-risk critical facilities: One state highway considered an emphasis corridor because of its importance to movement of people and freight are potentially at risk to avalanche:

1. State Route 20 – North Cascades Highway.

Region 1

Hazard: Drought

Characteristics	Principal Sources	Event History	Probability
Drought is a prolonged period of dryness severe enough to reduce soil moisture, water and snow levels below the minimum necessary for sustaining plant, animal, and economic systems. Drought can have a widespread impact on the environment and the economy, depending upon its severity, although it typically does not result in loss of life or damage to property, as do other natural disasters. In Region 1, drought conditions can reduce water available for irrigating crops and generating power at local dams, as well as affect the availability and cost of power for local industries such as food processing, aluminum smelting, and petroleum refining.	Drought is the result of many causes, often synergistic in nature; these include global weather patterns that produce persistent, upper-level high-pressure systems along the West Coast with warm, dry air resulting in less precipitation.	During 1895-1995, much of the state was in severe or extreme drought at least 5 percent of the time. Region 1 was in severe or extreme drought from 5 to 10 percent of the time during this period. 1977 Drought – this region experienced severe or extreme drought conditions between 10 to 20 percent of the time during this event. 2001 Drought – at the height of the event in March 2001, much of this region experienced severe or extreme drought conditions.	In temperate regions of the world, including Washington state, current long-range forecasts of drought have limited reliability. Meteorologists do not believe that reliable forecasts are attainable any more than a season in advance. Drought conditions of at least moderate severity occur every few years in Washington. On a long-term basis, Region 1 experiences drought conditions of at least moderate severity from 5 to 10 percent of the time.

Hazard: Drought **At Risk Population**: Unknown of region total 961,452 **PRELIMINARY ASSESSMENT**

State Agency Structures At Risk Number and Function of Buildings	No. of Affected Staff / Visitors / Residents	Approx. Value of Owned Structures	Approx. Value of Contents All Structures
Total at-risk buildings: No state facilities.	0	0	0
Total at-risk critical facilities: No state facilities.	0	0	0

Region 1

Hazard: Earthquake

Characteristics	Principal Sources	Event History	Probability
In general, Seismic Hazard Areas in Region 1 are found in: Areas near the Darrington-Devils Mountain, Strawberry Point, Southern Whidbey, or Utsalady Point faults. Floodplains and the adjacent bluffs in the Nooksack, Skagit, Stillaguamish, Skykomish, Snohomish and Snoqualmie River valleys because of their high or medium susceptibility to liquefaction and other ground failures. Bluffs along shorelines of Puget Sound and large lakes because of their susceptibility to landslides and other ground failures. Shorelines of Puget Sound and large lakes, because of their susceptibility to tsunamis and seiches.	1. Interplate earthquake in the offshore Cascadia Subduction Zone. Evidence of quakes with magnitude greater than 8 have been found along the Washington coast; the most recent event was about 1700. 2. Shallow, crustal earthquake in the North America (continental) plate. Two major faults run through Region 1. Evidence suggests the Darrington-Devils Mountain fault is capable of generating a magnitude 7.5 or greater earthquake, and the Southern Whidbey fault a M7.0 or greater earthquake. Two smaller faults, Utsalady Point and Strawberry Point, are capable of generating a M6.7 or greater earthquake. 3. Deep, Benioff zone earthquake within the Juan de Fuca plate. This is the source for the 1949, 1965, and 2001 earthquakes.	Since 1970, earthquakes of magnitude 4.0 or greater whose epicenter was in Region 1 occurred in 1971 (magnitude 4.1), 1976 (M5.1, M4.7), 1989 (M4.0, M4.2), 1990 (M4.3, M4.0, M5.0, M4.0), and 1994 (M4.3). The region received Presidential Disaster Declarations for the M6.5 Seattle-Tacoma earthquake in 1965 and the M6.8 Nisqually earthquake in 2001. The region did experience some damage from the M7.1 Olympia earthquake in 1949.	Approximate recurrence rate for a magnitude 9 earthquake in the Cascadia Subduction Zone is once every 350 to 500 years. Approximate recurrence rate for earthquakes similar to the 1965 magnitude 6.5 Seattle-Tacoma and 2001 magnitude 6.8 Nisqually events is once every 35 years. Approximate recurrence rate for earthquakes similar to the 1949 magnitude 7.1 Olympia event is once every 110 years. Approximate recurrence rate of a magnitude 6.5 or greater earthquake on the Seattle fault is about once every 1,000 years. Geologists have not yet determined specific recurrence intervals for earthquakes generated by the Darrington-Devils Mountain, Strawberry Point, Southern Whidbey, or Utsalady Point surface faults. However, they say a M6.5 or greater earthquake on a shallow, Puget Lowland fault occurs about once every 333 years.

Hazard: Earthquake **At Risk Population**: est. 317,134 of region total 961,452 **PRELIMINARY ASSESSMENT**

State Agency Structures At Risk Number and Function of Buildings	No. of Affected Staff / Visitors / Residents	Approx. Value of Owned Structures	Approx. Value of Contents All Structures
Total at-risk buildings: State Agency identified – 380 (109 leased, 271 owned)	47,036	$1,101,588,309	$1,283,641,419

Function of at-risk buildings: Included are:

- Campuses of Western Washington University, Everett Community College, and marine laboratories operated by Western Washington University and the University of Washington.
- 7 driver licensing offices.
- 26 state liquor stores.
- A variety of general offices and client services offices.
- Regional headquarters, local detachments, highway weigh scales, and communications facilities of the State Patrol.
- A campus leased to the federal government for a Job Corps Center.

Four structures have historic significance – one building is vacant pending seismic and ADA retrofits, one is leased, and two are at Western Washington University (Old Main, a building on the state and national historical registers used for administrative and educational purposes, and Edens Hall-South, a dormitory).

Two state highways considered emphasis corridors are potentially at risk to earthquake:

1. Interstate 5, from the Canadian Border south through Snohomish County.
2. State Route 20, from Whidbey Island east through Skagit and Whatcom Counties.

Additionally, ferry landings Anacortes, Clinton, Keystone, Mukilteo, and the San Juan Islands are potentially at risk because of their construction on poor soils in shoreline areas.

Total at-risk critical facilities: State Agency identified – 152 (owned-leased split not available)	38,282	$936,740,726	$1,909,157,816

Function of at-risk critical facilities: Included are:

- Administrative, educational, and dormitories on the Bellingham and Anacortes campuses of Western Washington University.
- Administrative and educational buildings at Everett Community College.
- Regional headquarters, local detachments, highway weigh scales, and communications facilities of the State Patrol.

- 25 state liquor stores.
- A variety of general offices and client services offices.

Two state highways considered emphasis corridors because of their importance to the movement of people and freight are potentially at risk to earthquake:

1. Interstate 5, from the Canadian Border south through Snohomish County.
2. State Route 20, from Whidbey Island east through Skagit and Whatcom Counties.

Additionally, ferry landings in Anacortes, Clinton, Keystone, Mukilteo, and the San Juan Islands are potentially at risk because of their construction on poor soils in shoreline areas.

Region 1

Hazard: Flood

Characteristics	Principal Flood Sources	Event History	Probability
Region 1 is subject to two types of flooding – flooding that occurs on the county's major river systems (see right) and flooding that is the result of urbanization, particularly in small stream basins. Because of their origins in upper elevations, rivers in the region are influenced by snow and rain patterns in the Cascade Mountains; flooding is most likely to occur from November through February during periods of heavy rainfall and rapid snowmelt. All six rivers travel through broad floodplains with long histories of flooding. Bank erosion also is a threat in the river valleys.	1. Nooksack River 2. Skagit River 3. Skykomish River 4. Snohomish River 5. Snoqualmie River 6. Stillaguamish River	Flooding in Region 1 is a common event. Since 1956, flooding resulted in Presidential Disaster Declarations in 1964, 1975, 1977, 1979, 1982, 1986, 1990 (3 disasters), 1995, 1996, 1997 (2 disasters), and 2003. Since 1989, Region 1 received more than $28.2 million in Stafford Act disaster assistance for repairs to public facilities following flood events; more than $26 million of the total went to Skagit, Snohomish, and Whatcom Counties. (Note: Figures do not include October 2003 flood disaster; assistance programs still being administered.)	The region's rivers typically flood every two to five years. Since 1956, this region has experienced serious flooding resulting in major damage and a Presidential Disaster Declaration about every 3 years. Skagit County (4.4 percent), Snohomish County (5.7 percent, and Whatcom County (3.5 percent) are among those with the largest percentage of area in the 100-year floodplain.

Hazard: Flood **At Risk Population**: est. 194,582 of region total 961,452 **PRELIMINARY ASSESSMENT**

State Agency Structures At Risk Number and Function of Buildings	No. of Affected Staff / Visitors / Residents	Approx. Value of Owned Structures	Approx. Value of Contents All Structures
Total at-risk buildings: State Agency identified – 34 (all leased)	1,933	$21,644,354	$14,926,953

Function of at-risk buildings: Primarily general office and client services, with 12 state liquor stores, three driver licensing offices, and three employment and training services centers. No structures identified as potentially having historic significance.

Two state highways considered emphasis corridors because of their importance to movement of people and freight are potentially at risk to flood where they cross or run through floodplains:

1. Interstate 5, from the Canadian Border south through Snohomish County.
2. State Route 20, from Whidbey Island east through Skagit and Whatcom Counties.

Additionally, ferry landings in Anacortes, Clinton, Keystone, Mukilteo, and the San Juan Islands are potentially at risk to the impacts of coastal flooding.

Total at-risk critical facilities: State Agency identified – 19 (all leased)	1,071	$0	$9,855,758

Function of at-risk critical facilities: Essential program support activities, and state liquor stores.

Two state highways considered emphasis corridors because of their importance to movement of people and freight are potentially at risk to flood where they cross or run through floodplains:

1. Interstate 5, from the Canadian Border south through Snohomish County.
2. State Route 20, from Whidbey Island east through Skagit and Whatcom Counties.

Additionally, ferry landings in Anacortes, Clinton, Keystone, Mukilteo, and the San Juan Islands are potentially at risk to the impacts of coastal flooding.

Region 1

Hazard: Landslide

Characteristics	Principal Sources	Event History	Probability
Region 1 is part of two landslide provinces. Puget Lowland-North Cascade Foothills province – Unconsolidated material overlies the bedrock of much of the Puget Lowland. The lowland bluffs are susceptible to landslides because of their steepness, abundant rainfall and resulting groundwater, and contrasts in permeability of materials. Four landslides affect these bluffs: slumps, debris flows, ancient landslides in unconsolidated materials, and submarine landslides. The North Cascade Foothills are susceptible to landslides in bedrock. The foothills are subject to moist Pacific storms. Two landslide types affect the foothills: debris flows and bedrock landslides. Cascade Mountains province – The valley walls of the Cascades north of Snoqualmie Pass have areas of small rock falls, but few landslides otherwise.	1. Bluffs along shorelines of the Strait of Juan de Fuca and Puget Sound. 2. Foothills of the Cascade Mountains. 3. Cascade Mountains.	Early 1800s – Historical account of large landslide in Snohomish County at Camano Head, south end of Camano Island, created a tsunami that went south toward Hat Island. Winter storm of 1996-97 – Generated several landslides on Puget Sound bluffs near at Edmunds, Mukilteo, and Woodway, Snohomish County. The Woodway slide pushed five train cars into Puget Sound and blocked rail traffic for nearly two weeks. Landslide in Whatcom County ruptured natural gas lines, causing explosion. Nisqually earthquake 2001 – A major rock fall occurred on the north side of U.S. Highway 2 near Skykomish, Snohomish County. October-December 2003 – Major ground failures, landslides and rock falls severely damaged the North Cascades Highway US 20, isolating the community of Diablo, Skagit County.	Ground failures that result in landslides have a number of contributing factors that do not allow for the development of a reasonable estimate probability of future events. Factors that contribute to ground failure and landslides include: • Local topography. • Erosion on slopes. • Saturation of slopes. • Earthquakes. • Volcanic deposits and debris flows. • Excess weight on weak slopes. • Human action that disturbs slopes.

Hazard: Landslide **At Risk Population**: Unknown of region total 961,452 **PRELIMINARY ASSESSMENT**

State Agency Structures At Risk Number and Function of Buildings	No. of Affected Staff / Visitors / Residents	Approx. Value of Owned Structures	Approx. Value of Contents All Structures
Total at-risk buildings: State Agency identified – 52	9,458	$277,414,706	$245,161,407

Function of at-risk buildings: Included are:

- 29 facilities at main campus of Western Washington University (including eight buildings used for educational purposes and various infrastructure systems) and two satellite centers in Everett.
- 7 driver licensing offices.
- 2 state liquor stores.
- About 14 general office and client services facilities.

Two state highways considered emphasis corridors are potentially at risk to landslide as they cross steep slopes:

1. Interstate 5, from the Canadian Border south through Snohomish County.
2. State Route 20, from Whidbey Island east through Skagit and Whatcom Counties.

Additionally, ferry landings in Anacortes, Clinton, Keystone, Mukilteo, and the San Juan Islands are potentially at risk of ground failure due to their construction on poor soils in shoreline areas.

Total at-risk critical facilities: State Agency identified - 23	9,169	$267,988,700	$239,764,854

Function of at-risk critical facilities: Included are 11 facilities at main campus of Western Washington University; two state liquor stores; and about eight general office and client services facilities.

Two state highways considered emphasis corridors are potentially at risk to landslide as they cross steep slopes:

1. Interstate 5, from the Canadian Border south through Snohomish County.
2. State Route 20, from Whidbey Island east through Skagit and Whatcom Counties.

Additionally, ferry landings in Anacortes, Clinton, Keystone, Mukilteo, and the San Juan Islands are potentially at risk of ground failure due to their construction on poor soils in shoreline areas.

Hazard: Severe Storm

Characteristics	Principal Sources	Event History	Probability
A severe storm is an atmospheric disturbance that results in one or more of the following phenomena: strong winds and large hail, thunderstorms, tornados, rain, snow, or other mixed precipitation. Most storms move into Washington from the Pacific Ocean. Typically, major impacts from a severe storm are to transportation and loss of utilities.	1. High winds 2. Tornado 3. Winter storm 4. Blizzard 5. Coastal flooding	Severe storm in Region 1 is a common event. Since 1956, severe storm events resulted in Presidential Disaster Declarations in 1962, 1975, 1977, 1979, 1986, 1990 (two disasters), 1993, 1995, 1996. Since 1989, Region 1 received more than $34.8 million in Stafford Act disaster assistance for repairs to public facilities following severe storm events; more than 70 percent of the assistance has gone to Snohomish County.	Projected recurrence rates for the severe storm events to which Region 1 is most vulnerable are as follows: High wind events occur once or twice a year throughout the region. Tornadoes occur about once every 10 years in Snohomish County. Winter storms occur at least once every two years throughout the region. Blizzards occur at least once every 40 years in Whatcom County. Coastal flooding occurs about once every four years in coastal areas of the region.

Region 1

Hazard: Severe Storm **At Risk Population**: 961,452 of region total 961,452 **PRELIMINARY ASSESSMENT**

State Agency Structures At Risk Number and Function of Buildings	No. of Affected Staff / Visitors / Residents	Approx. Value of Owned Structures	Approx. Value of Contents All Structures
Total at-risk buildings: State Agency identified – 369 (268 owned, 99 leased, and 2 other ownership).	46,864	$1,095,725,808	$1,280,669,872

Function of at-risk buildings: Included in the state facilities potentially at-risk to severe storms are the following:

- The buildings and infrastructure on the main campus of Western Washington University and the marine laboratory it operates.
- The campus of Everett Community College.
- The campus of the marine laboratory operated by the University of Washington.
- The campus of the North Cascades Gateway Center operated by the Department of General Administration, including a number of buildings leased to the Sedro Woolley schools for educational purposes and to the federal government for a Job Corps Center.
- The highway weigh scales, communications facilities and local detachments of the Washington State Patrol.
- 24 state liquor stores and six driver licensing offices.
- Six facilities used for client services and general office purposes.

Three structures have historic significance – one building is vacant pending seismic and ADA retrofits, and two are at Western Washington University (Old Main, a building on the state and national historical registers used for administrative and educational purposes, and Edens Hall-South, a dormitory).

Additionally, ferry landings in Anacortes, Clinton, Keystone, Mukilteo, and the San Juan Islands are potentially at risk due to exposure to high winds and surf on exposed shorelines.

Total at-risk critical facilities: State Agency identified – 155 (owned-leased split not available).	38,296	$936,740,726	$1,221,430,636

Function of at-risk critical facilities: Included in the state facilities potentially at-risk to severe storms are the following:

- Buildings and infrastructure at both the main campus and marine laboratory of Western Washington University.
- 16 buildings used for client services and essential program support activities by the Department of Social and Health Services.
- 24 state liquor stores.
- 28 facilities used for offices, communications, and local detachments by the Washington State Patrol.

Additionally, ferry landings in Anacortes, Clinton, Keystone, Mukilteo, and the San Juan Islands are potentially at risk due to exposure to high winds and surf on exposed shorelines.

Hazard: Tsunami

Characteristics	Principal Sources	Event History	Probability
A tsunami resembles a series of quickly rising tides that withdraw with currents much like those of a river. Swift currents commonly cause most of the damage. A Pacific Ocean tsunami can affect the entire Pacific basin, while a tsunami in inland waters can affect many miles of shoreline. Tsunamis typically cause the most severe damage and casualties near their source. Waves are highest there because they have not yet lost much energy. Another class of damaging water wave is a seiche. A seiche is a wave generated in a body of water from the passage of seismic waves caused by earthquakes. Sedimentary basins beneath the body of water can amplify a seismic seiche and the natural sloshing action in a body of water or focus water waves onto a section of shoreline.	Tsunamis and seiches can be generated by a number of sources: 1. Distant earthquakes along the Pacific Rim (i.e., 1964 Alaska earthquake). 2. Local earthquakes, such as those generated by local surface faults; in the Benioff zone; or in the Cascadia Subduction Zone off the coast. 3. Large landslides into bodies of water, such as Puget Sound or lakes. 4. Submarine landslides in bodies of water such as Puget Sound.	A.D. 900-930 – A magnitude 7+ earthquake on the Seattle fault, created uplift on the floor of Puget Sound. The uplift generated a tsunami that deposited a sand sheet at Cultus Bay on southern Whidbey Island and along tributaries of the Snohomish River between Everett and Marysville. Early 1800s – A large landslide in Snohomish County at Camano Head, south end of Camano Island, created a tsunami that struck Hat Island, destroying homes or encampments and drowning people. Additionally, scientists believe that tsunamis from great Cascadia Subduction Zone earthquakes account for several sand sheets on northwestern Whidbey Island (dates not available).	Geologists have not yet determined recurrence intervals for earthquakes generated by local surface faults that have the potential to cause a tsunami or seiche – the Darrington-Devils Mountain, Strawberry Point, Southern Whidbey, or Utsalady Point surface faults. Estimated recurrence rate of an earthquake on the Seattle fault of the size necessary to generate a tsunami or seiche is estimated at once every 1,100 years. Great earthquakes in the North Pacific or along the Pacific coast of South America that generate tsunamis that sweep through the entire Pacific basin occur at a rate of about six every 100 years. Scientists will develop tsunami inundation models and complete maps for Anacortes, Bellingham and Whidbey Island areas in 2004.

Hazard: Tsunami **At Risk Population**: est. 86,957 of region total 961,452 **PRELIMINARY ASSESSMENT**

State Agency Structures At Risk Number and Function of Buildings	No. of Affected Staff / Visitors / Residents	Approx. Value of Owned Structures	Approx. Value of Contents All Structures
Total at-risk buildings: State Agency identified – 15 (4 owned, 11 leased)	473	$6,653,039	$5,841,499

Function of at-risk buildings: Included in the state facilities potentially at risk to the direct and indirect impacts of tsunami are the following:

- Buildings at a marine laboratory operated by Western Washington University.
- General office and client services.

Additionally, ferry landings in Anacortes, Clinton, Keystone, Mukilteo, and the San Juan Islands are potentially at risk due to their exposure on shoreline areas.

Total at-risk critical facilities: State Agency identified – 4 (all owned)	52	$1,975,200	$2,059,000

Function of at-risk critical facilities: Included in the state facilities potentially at risk to the direct and indirect impacts of tsunami are four structures at a marine laboratory operated by Western Washington University (includes three residential facilities).

Additionally, ferry landings in Anacortes, Clinton, Keystone, Mukilteo, and the San Juan Islands are potentially at risk due to their exposure on shoreline areas.

Region 1

Hazard: Volcano

Characteristics	Volcanoes in Region	Event History	Probability
Region 1 is home to two of the state's five volcanoes – Glacier Peak and Mount Baker. Volcanoes can lie dormant for centuries between eruptions; the risk posed by volcanic activity is not always apparent. When Cascades volcanoes do erupt, high-speed avalanches of hot ash and rock called pyroclastic flows, lava flows, and landslides can devastate areas 10 or more miles away, while huge mudflows of volcanic ash and debris called lahars can inundate valleys more than 50 miles downstream. Falling ash from explosive eruptions can disrupt human activities hundreds of miles downwind, and drifting clouds of fine ash can cause severe damage to the engines of jet aircraft hundreds or thousands of miles away. Because people are moving into areas near these mountains at a rapid pace, the state's volcanoes are among the most dangerous in the United States.	1. Glacier Peak 2. Mount Baker	Mount Baker in Whatcom County erupted in the mid 1800s for the first time in several thousand years. Activity at steam vents near the summit increased beginning in 1975; an eruption is not imminent. The volcano is not showing signs of renewed activity. Glacier Peak in Snohomish County erupted at least six times in the past 4,000 years. Powerful eruptions 13,000 years ago deposited ash as far away as Wyoming. Since glacial times, Glacier Peak has had larger and more explosive eruptions than every other Washington volcano except Mount St. Helens.	The main hazards from the volcanoes in Region 1 are lahars and debris avalanches. Mount Baker: The largest lahar, Class M, has a projected recurrence interval about once every 14,000 years. Smaller lahars, Class 1 and Class 2, have projected recurrence intervals of once every 500 years and once every 100 years, respectively. Glacier Peak: The annual probability for a lahar that extends at least to the lower Suiattle River or to the confluence of the White Chuck and Sauk Rivers is roughly 1 in 1,000 to 1 in 2,000. The annual probability that a lahar would reach Puget Sound is about 1 to 2 in 10,000. The annual probability of lahars inundating the Stillaguamish River valley is less than 1 in 10,000. Ash fall – Due to prevailing westerly winds, the possibility of an annual ash fall from any major Cascade volcano of one centimeter in Region 1 ranges from 1 in 1,000 to 1 in 5,000, depending on location.

Region 1

Hazard: Volcano **At Risk Population**: est. 103,608 of region total 961,452 **PRELIMINARY ASSESSMENT**

State Agency Structures At Risk Number and Function of Buildings	No. of Affected Staff / Visitors / Residents	Approx. Value of Owned Structures	Approx. Value of Contents All Structures
Total at-risk buildings: State Agency identified – 24 (5 owned, 19 leased).	1,113	$8,109,176	$5,396,795

Function of at-risk buildings: Included in the state facilities potentially at risk to lahar or ash fall from a volcanic eruption are the following:

- 7 offices for employment and training services.
- 4 state liquor stores.
- 6 general office and client services facilities.
- 2 detachments four facilities of the communications network of the Washington State Patrol.

Two state highways considered emphasis corridors because of their importance to movement of people and freight are potentially at risk to volcanic eruptions that produce lahars in river valleys crossed by the highways:

1. Interstate 5, from the Canadian Border south through Snohomish County.
2. State Route 20, from Whidbey Island east through Skagit and Whatcom Counties.

Total at-risk critical facilities: State Agency identified – 11 (All leased)	326	$1,627,624	$$10,763,038

Function of at-risk critical facilities: Included in the state facilities potentially at risk to lahar or ash fall from a volcanic eruption are the following:

- 4 state liquor stores.
- 6 general office and client services facilities.
- 2 detachments four facilities of the communications network of the Washington State Patrol.

Two state highways considered emphasis corridors because of their importance to movement of people and freight are potentially at risk to volcanic eruptions that produce lahars in river valleys crossed by the highways:

1. Interstate 5, from the Canadian Border south through Snohomish County.
2. State Route 20, from Whidbey Island east through Skagit and Whatcom Counties.

Hazard: Wildland Fire

Characteristics	Principal Sources	Event History	Probability
Wildland fires are fires caused by nature or humans that result in the uncontrolled destruction of forests, brush, field crops, grasslands, and real and personal property in non-urban areas. A fire needs three elements in the right combination to start and grow – a heat source, fuel, and oxygen. How a fire behaves primarily depends on the characteristics of available fuel, weather conditions, and terrain. The wildland fire season in Washington usually begins in early July and typically culminates in late September with a moisture event. Drought, snow pack, and local weather conditions can expand the length of the fire season.	1. Humans – People start most wildland fires; from 1992 to 2001, people, on average, caused more than 500 wildland fires each year on state-protected lands. Human-caused fires burn an average of 4,404 state-protected acres each year. 2. Lightning on average started 135 wildland fires annually on state-protected land during 1992-2001. Lightning-caused fires burn more state-protected acreage than any other cause, an average of 10,866 acres annually.	None of the state's most significant wildland fires occurred in Region 1, although smaller wildland fires have occurred in the region. Region 1 is part of the Northwest fire protection region of the Washington Department of Natural Resources (this fire protection region also includes the Stevens Pass area of King County). During 1992-2001, the Northwest region averaged 77 fires a year that burned an average of 267 acres of state-protected lands. Among the larger fires during 1992-2001 on state-protected land are the Taylor Creek fire in 1995 that burned 259 acres in Skagit County, and the Face Off fire that burned 60 acres in Snohomish County.	Nearly all of the state's significant wildland fires have occurred in Eastern Washington. Western Washington is less prone to catastrophic wildland fires than Eastern Washington – the east has both lighter fuels that burn more easily and more snags and hazard trees, and weather conditions more favorable to fire (thunderstorms with dry lightning are more prevalent in the east). Also, the west has a shorter fire season than the eastern half of the state – the west receives more rainfall, has wetter and cooler spring seasons, and is more urbanized.

Hazard: Wildland Fire **At Risk Population**: est. 34,600 of region total 961,452 **PRELIMINARY ASSESSMENT**

State Agency Structures At Risk Number and Function of Buildings	No. of Affected Staff / Visitors / Residents	Approx. Value of Owned Structures	Approx. Value of Contents All Structures
Total at-risk buildings: State Agency identified – 189 (141 owned, 47 leased, 1 other ownership)	36,708	$955,544,705	$1,216,582,611

Function of at-risk buildings: Included in the state facilities potentially at risk to wildland fire are the following:

- The buildings, utility systems, and grounds of the main campus of Western Washington University.
- 10 state liquor stores.
- 38 facilities used as general offices and for client services
- 31 buildings used for detachments, highway weigh stations, and communications by the Washington State Patrol.

Two structures at Western Washington University have historic significance – Old Main, a building on the state and national historical registers used for administrative and educational purposes, and Edens Hall-South, a dormitory.

Total at-risk critical facilities: State Agency identified – 116 (breakout of owned and leased unavailable).	36,109	$904,434,526	$1,183,076,082

Function of at-risk critical facilities: Included in the state facilities potentially at risk to wildland fire are the following:

- Buildings used for offices, dispatch centers, and communications by the Washington State Patrol.
- Buildings and infrastructure on the Western Washington University campus
- Facilities housing essential program support activities of the Department of Social and Health Services.
- State liquor stores.

[1] *Island County Profile*, Washington Department of Employment Security, Labor Market and Economic Analysis Branch, April 2000.

[2] *San Juan County Profile*, Washington Department of Employment Security, Labor Market and Economic Analysis Division, September 1999.

[3] *Skagit County Profile*, Washington Department of Employment Security, Labor Market and Economic Analysis Branch, January 2002.

[4] *Snohomish County Profile*, Washington Department of Employment Security, Labor Market and Economic Analysis Branch, April 2001.

[5] *Whatcom County Profile*, Washington Department of Employment Security, Labor Market and Economic Analysis Branch, March 2001.

[6] *Profile of Selected Economic Characteristics: Census 2000*, U.S. Census Bureau.

[7] *Traffic Statistics Rider Segment Report, January 1, 2002 through December 31, 2002*, Washington State Ferries.

[8] *Summary of Public Transportation 2001*, Washington State Department of Transportation, November 2002 (Revised April 2003).